

Commonwealth of Kentucky
Division for Air Quality
PERMIT STATEMENT OF BASIS

TITLE V FINAL PERMIT NO. V-02-001 REVISION 3
Thoroughbred Generating Company, LLC
701 Market Street, 6th Floor, St. Louis, MO 63101

APRIL 13, 2006

TOM ADAMS, REVIEWER

SOURCE A.I.#: 35762

PLANT I.D. #: 21-177-00077

ACTIVITY #: APE2006001

CURRENT PERMITTING ACTION: MINOR REVISION

The permit is being modified per *Secretary's Findings, Conclusions of Law and Final Order, DAQ-26003-037 & DAQ-26048-037, Filed April 11, 2006*, from petitions of Sierra Club, Valley Watch, Inc, Leslie Barras, Hillary Lambert and Roger Brucker vs. Environmental and Public Protection and Thoroughbred Generating Company, LLC. The order established new emission standards for mercury and nitrogen oxides. Additionally the order required that to the extent Revision #2 does not incorporate all of the compliance provision set forth in the Statement of Basis, DAQ shall incorporated those provisions into the permit.

Pursuant to 40 CFR 60.45Da and *Secretary's Findings, Conclusions of Law and Final Order, DAQ-26003-037 & DAQ-26048-037, Filed April 11, 2006*, mercury emissions shall not exceed 21×10^{-6} lbs/MWh (Gross output) based on a consecutive twelve (12) month rolling average.

Pursuant to 401 KAR 59:016, Section 5(1)(c), 401 KAR 51:017 and *Secretary's Findings, Conclusions of Law and Final Order, DAQ-26003-037 & DAQ-26048-037, Filed April 11, 2006*, nitrogen oxides emissions shall not exceed 0.07 lbs/mmBtu from each unit based on a thirty (30) day rolling average. Pursuant to 401 KAR 59:016, Section 6(2), compliance with the 0.07 lb/mmBtu emission limitation shall constitute compliance with the 65% reduction requirement contained in 401 KAR 59:016, Section 5(2).

Pursuant to *Secretary's Findings, Conclusions of Law and Final Order, DAQ-26003-037 & DAQ-26048-037, Filed April 11, 2006*, upon the first permit renewal application by the permittee following the optimization study required in D.5 of the permit, the Division shall analyze the optimization study to determine if the permittee shall be required to meet a 99% efficiency requirement for sulfur dioxide removal based upon a 30 day rolling average.

Further, in accordance with the Secretary's findings, Revision 2 of this permit has been evaluated vis-à-vis the compliance provisions set forth in the Statement of Basis to ensure that such compliance provision in the Statement of Basis are contained in the revised permit. To that end, the requirements in Section B for the cooling towers and Section D of this permit have been expanded and revised.

PAST PERMITTING ACTION-V-0-001 Revision 2-

Thoroughbred Generating Company, LLC submitted a request for revision received July 8, 2004, to revise a permit to construct and operate a Pulverized Coal steam electric generating station in Muhlenberg County, Kentucky. The construction will consist of two 7443 mmBtu/hr Pulverized Coal (PC) boilers which will operate with a total nominal output capacity of 1500 megawatts (MW). Each PC boiler is to be equipped with its own exhaust stack located within a common chimney and will be equipped for fuel oil start-up. Other facilities to be constructed will include Flue Gas Desulfurization (FGD) reagent, ash, and solid waste by product storage and handling equipment; an auxiliary boiler; two cooling towers; oil storage tank; an emergency generator; and two diesel and one electric powered fire pumps. The plant is to be permitted to operate 8760 hours per year for each unit. The proposed plant will be a major source as defined in 401 KAR 51:017 (40 CFR 52.21), *Prevention of Significant Deterioration (PSD) of air quality*. The potential emissions of regulated air pollutants including particulate matter (PM & PM₁₀), sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds (VOC) are in excess of 250 tons per year. Additionally, the emissions of volatile organic compounds (VOCs), fluorides as HF, mercury (Hg), beryllium (Be), and Sulfuric Acid (H₂SO₄) mist are subjected to PSD review since these emissions exceed the significant emission rates as presented in Regulation 401 KAR 51:017, Section 22.

COMMENTS:

Conflicting coefficients between SOB and Permit

1. The Permit should be changed so that the 24-hour limit for SO₂ is based on 110% of the 97.5% single-sided upper confidence interval.

Response: The Division has revised the equation in Section D.4 on page 35 of 50 of the permit to reflect the more stringent condition, by changing the coefficient from 135% in the prior version to 110% in the revised version.

Omission of exponent "2" from 24-hour SO₂ limit equation

2. The standard deviation (parenthesis that follows 1.96) should be divided by the square root of n (i.e. n in the denominator under the square root sign should be n^2)

Response: The Division concurs. The Division has revised the equation in Section D.5 on page 35 of 50 of the permit, by changing the " n " in the denominator in the prior version to " n^2 " in the revised version.

Grab or Composite Samples

3. The Permit should be amended to clarify that quarterly composite samples for HAPs are required.

Response: The Division concurs. Also, while reviewing the permit regarding this proposed change, the Division noted a minor discrepancy between the language in Section B.4(j) on page 7 of 50 of the permit and the actual monitoring requirements in the table in Section B.4(m) on pages 9-10 of 50 of the permit. The prior language of Section B.4(j) stated, in pertinent part, that, "[t]he samples taken on a daily basis shall be uniformly mixed to form a composite sample analyzed to determine beryllium; fluorides as HF; and mercury content." However, the table on pages 9-10 of the permit indicates that the grab/composite sampling is to be done to determine mercury, arsenic,

beryllium, chromium, magnesium, lead, and cadmium content.

Section B.4(j) on page 7 of 50 of the permit and the table in Section B.4(m) on pages 9-10 of 50 of the permit have been revised to require the permittee to take a sample of fuel "as fired" to the PCs on a daily basis. The daily samples will then be uniformly mixed to form a composite sample which will be analyzed on a quarterly basis to determine the mercury, arsenic, beryllium, chromium, magnesium, lead, and cadmium content of the TGC coal.

The Division has also revised the table in Section B.4(m) on pages 9-10 of 50 of the permit for purposes of clarity, by placing all of the non-mercury metallic HAPs into one cell of the table instead of individual cells as they were in the prior version.

Error in regulatory reference

4. The reference in the Permit to 401 KAR 50:055, Section 1(a) should be corrected to read "Section 2(1)(a)."

Response: The Division concurs. Although an improper citation does not change the underlying regulatory requirements, the Division has revised Section B.3(a) on page 4 of 50 of the permit to state "401 KAR 50:055, Section 2(1)(a)."

Error in Cadmium limit

5. The application and the Permit should concur with respect to the cadmium limit for each boiler, rather than both combined.

Response: The Division concurs. This is not a relaxation of an emission limit, and is correct according to the underlying BACT and MACT analyses (note that $0.0238 \div 2 = 0.0119$). The Division has revised the table in Section B.2(m) on page 4 of 50 of the permit to state that the cadmium limit for each PC boiler is 0.0119 tons per year.

Non-mercury Metallic HAP Permit limits

6. The percent removal used to set the Permit limits for non-mercury metallic HAPs needs to be clarified as either 99.5% to 99.9% or 80% to 98%.

Response: The Division concurs. The Division has revised the table in Section B.7(e) on page 14 of 50 of the permit to state that the control technology for the non-mercury metallic HAPs (arsenic, beryllium, cadmium, chromium, lead and manganese) is Wet and Dry Electrostatic Precipitators with an approximate control efficiency of 99.5% to 99.9% control efficiency for PM. Lead was previously listed along with "Mercury" in the table. That reference to lead was deleted from that cell of the table and was moved to the final cell of the table, as it is a non-mercury metallic HAP.

Filterable/condensable PM₁₀

- 7(a). A clarification should be made in the Permit and SOB stating that the use of filterable and condensable PM are regulated.

Response: The Division concurs. The reference to PM/PM₁₀ in Section D. 1 on page 35 of 50 of the permit has been clarified to state that the regulated particulate matter pollutant is "PM/PM₁₀ (filterable and condensable)".

Filterable/condensable PM₁₀

- 7(b). The permit should specifically require testing for condensables by a method to be developed by the Department.

Response: The Division acknowledges this comment. Method 202 is currently the only approved method in 40 C.F.R. Chapter I for measuring condensable PM₁₀. Kentucky's regulation 401 KAR 50:045, Section 3(2) states for alternative test methods that

Performance tests required hereunder or by any other administrative regulation of the Division for Air Quality for affected facilities which are not subject to a standard of performance promulgated under 40 CFR 60 or 40 CFR 61 shall be conducted, and data shall be reduced, in accordance with the methods and procedures contained in each applicable administrative regulation unless:

(a) The cabinet specifies or approves minor changes in methodology;

(b) The cabinet specifies or approves the use of some other method the results of which it has determined to be adequate for indicating whether a specific source is in compliance....

Section D.2 on page 35 of 50 of the permit has been revised and a new condition, D.3, has been added to reflect Kentucky's authority under a SIP-approved program to specify or approve an alternative test method to measure PM₁₀ (condensable) and VOCs without seeking concurrent approval by U.S. EPA. Section D.2 specifies that PM/PM₁₀(filterable), sulfur dioxide (SO₂), nitrogen oxides (NO_x), and carbon monoxide (CO) are to be measured and tested for compliance by applicable reference methods, or by methods approved by the cabinet and U.S. EPA.

Clarify Frequency of Stack testing

8. A clarification should be made in the Permit with respect to the frequency of PM stack tests..

Response: The Division concurs. Different testing frequencies to meet different regulatory requirements were listed in the permit. To simplify compliance the permit has been changed to reflect the most stringent requirement. Section B.3(b) on page 4 of 50 of the permit has been revised to require the permittee to conduct a performance test for particulate emissions annually after demonstrating compliance with the allowable standard.

Clarify HAP compliance testing

9. A clarification should be made in the Permit with respect to the initial testing and frequency of compliance testing required for certain HAPs.

Response: The Division concurs. Section B.3(g) on page 5 of 50 of the permit has been revised to state that:

during the initial compliance test, the permittee shall take a representative sample of the fuel "as fired" and analyze it to determine the HAP content in the fuel. This information shall be used to establish a correlation between the sample's HAP content and HAP emissions for monitoring purposes, except for VOC(HAPs). The permittee shall demonstrate compliance with these emissions limits annually. This testing shall be used to validate the correlation between composite sample HAP content and HAP emissions, except for VOC(HAPs).

The Division has considered the suggested language "when applicable" in TGC's requested revision, and has determined that language to be unnecessary. Therefore, that language has not been added to the permit.

Fuel Oil Sulfur content

10. Fuel Oil sulfur content is not consistently listed in the permit.

Response: The Division concurs. There are several affected facilities that burn fuel oil from a common supply tank at the site. Low sulfur fuel oil is defined by an American Society for Testing and Materials (ASTM) standard, ASTM D 975-04b, "Standard Specification for Diesel Fuel Oils," as diesel fuel having a sulfur content of 500 ppm (which equates to 0.05%). Section B Description, page 2; Section B Description, page 15; Section C Description 1, page 34; and Section C Description 6, page 34 of the permit have been revised to state that all fuel oil will have a 0.05% Sulfur limit.

Clarify compliance provision contained in SOB with Permit

11. A clarification may be made with respect to the certain compliance provisions contained in the SOB, but not found in the Permit.

Response: The Division concurs. While the omission of these requirements from the permit did not render the permit unenforceable, the Division believes that including the provisions helps clarify the permit. Therefore, Section D.1 on page 35 of 50 of the permit has been revised to state that the listed pollutants [PM/PM₁₀ (filterable and condensable), sulfur dioxide, carbon monoxide, nitrogen oxides, VOC and visible (opacity)] "shall be measured by applicable reference methods, or equivalent or alternative methods approved by the cabinet (and U.S.EPA, if required), and shall not exceed the respective limitations specified herein." The prior version of the permit did not list VOCs along with the other pollutants. See also, cabinet's response to 7(b), above.

The monitoring provisions for the cooling towers in Section B.4 on page 32 of 50 of the permit have been revised to state that:

[t]he Permittee shall measure the total dissolved solids (TDS) content on at least a monthly basis, Measurement of TDS in the wastewater discharge permit associated the units as required by National Pollutant Discharge Elimination System (water) permit, may be used to satisfy this requirement if the effluent has not been diluted or otherwise treated in a manner that would significantly reduce the TDS content.

Discrepancy between Permit Application and permit with respect to heat rate of boilers

12. The permit incorrectly lists the nameplate rating of the boilers as 7446 instead of 7443 mmBtu/hr. The Permit may be changed to demonstrate consistency with the Permit Application.

Response: The Division has revised Section B Description on page 2 of 50 of the permit to state that the nominal heat rate of the PC boilers is 7443 mmBtu/hour.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.

BEN MARKIN, REVIEWER
PLANT I.D. # 21-177-00077
APPLICATION LOG # 53619-20

SOURCE DESCRIPTION:

Thoroughbred Generating Company, LLC submitted a revised permit application dated October 26, 2001, to construct and operate a Pulverized Coal steam electric generating station in Muhlenberg County, Kentucky. The construction will consist of two 7443 MM BTU/hr Pulverized Coal Boilers (PCB) which will operate with a total nominal output capacity of 1500 megawatts (MW). Each PCB is to be equipped with its own exhaust stack located within a common chimney and will be equipped for fuel oil start-up. Other facilities to be constructed will include Flue Gas Desulfurization (FGD) reagent, ash, and solid waste by product storage and handling equipment; an auxiliary boiler; two cooling towers; oil storage tank; an emergency generator; and two diesel and one electric powered fire pumps. The plant is to be permitted to operate 8760 hours per year for each unit. The proposed plant will be a major source as defined in 401 KAR 51:017 (40 CFR 52.21), *Prevention of Significant Deterioration (PSD) of air quality*. The potential emissions of regulated air pollutants including particulate matter (PM & PM10), sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds (VOC) are in excess of 250 tons per year. Additionally, the emissions of volatile organic compounds (VOCs), fluorides as HF, mercury (Hg), beryllium (Be), and Sulfuric Acid (H₂SO₄) mist are subjected to PSD review since these emissions exceed the significant emission rates as presented in Regulation 401 KAR 51:017, Section 22.

COMMENTS:

General Comments on Proposed TV/Final PSD from EPA Region 4

1. Section D, Condition 4) - discusses conducting an optimization study for the purpose of re-setting the sulfur dioxide 24-hour emissions limit toward a 0.23 lb-SO₂/MMBtu limit. This condition should additionally clarify that any revised 24-hour limit shall not exceed the initial 24-hour limit of 0.41 lb-SO₂/MMBtu heat input.

Response: *The Division acknowledges the comment and has revised the permit.*

2. Section G, Condition (b)1. - states that the permit is valid for a term of five years. We understand from discussion with KDAQ that this conditions only refers to the Title V permit term and it does not apply to the prevention of significant deterioration construction permit, which has no expiration date. Because this is a merged PSD/Title V permit, KDAQ should consider adding a statement clarifying that the BACT requirements do not expire even upon expiration of the Title V permit.

Response: *The Division acknowledges the comment.*

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.

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